

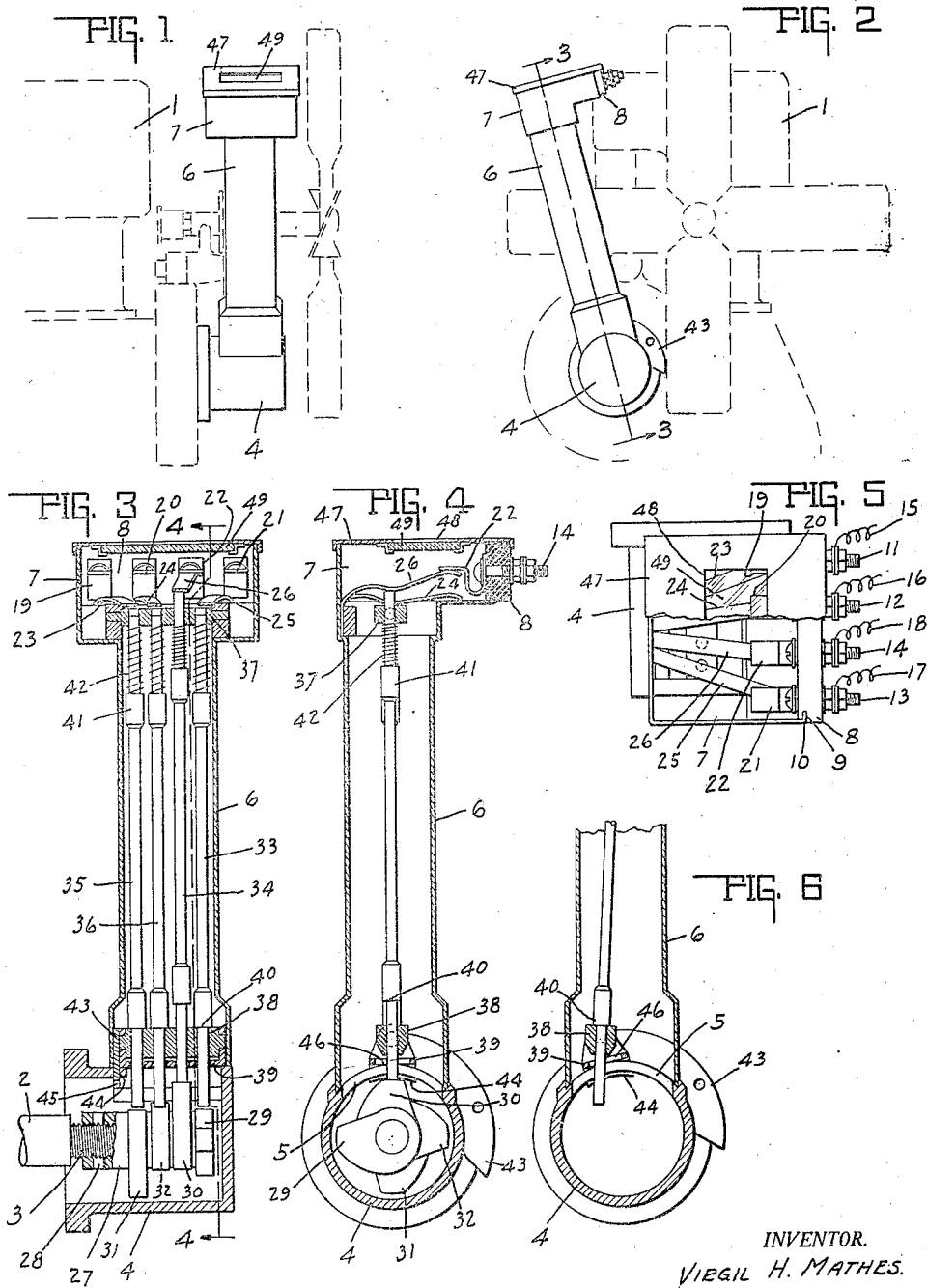
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V. H. MATHES

TIMER

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TIMER.

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To all whom it may concern:

Be it known that I, VIRGIL H. MATHES, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Timers, of which the following is a specification.

This invention relates to improvements in timers of that class used in connection with internal combustion engines, and one feature of the invention is the provision of means for positively closing a circuit through the various ignition wires connected with the timer.

A further feature of the invention is in so constructing the timer that the wires associated therewith will be entirely removed from the path of any of the operating parts of the motor.

A further feature of the invention is the provision of means for readily advancing or retarding the spark created by the timer.

And a further feature of the invention is the provision of a housing in which are located spark forming contacts, said housing having a visual space so that the operation of the contact points may be observed at any time.

Other objects and advantages will be hereinafter more fully set forth and pointed out in the accompanying specification.

In the accompanying drawings.

Figure 1 is a side elevation of the front end of a motor showing the timer attached thereto,

Figure 2 is a front elevation thereof,

Figure 3 in an enlarged sectional view through the timer as seen on line 3—3, Figure 2,

Figure 4 is a sectional view as seen on line 4—4, Figure 3,

Figure 5 is a top plan view of the timer with parts broken away, and

Figure 6 is a detail view similar to Figure 4, showing a different adjustment of the contact forming means and with the operating cam therefor removed.

Referring to the drawings, 1 indicates an engine of the internal combustion type, and 2 a cam shaft associated with the engine, also of the usual type. Surrounding the threaded end 3 of the cam shaft 2 is a casing 4 which is attached to the parts of the engine 1 in any suitable manner. The peripheral wall of the casing 4 has an opening

5 therethrough over which is positioned a hollow sleeve 6, the lower end of the sleeve being connected to the casing in any suitable manner.

In arranging timers of this class, particularly of the Ford type, it has been the custom heretofore to so position said timers that the ignition wires would be exposed to contact with parts of the motor so as to wear the insulation from the wires and cause short circuits, and in timers of the well known type it has been necessary to remove parts if not all of the timing device in order to gain access to the operating parts thereof.

To overcome these objectionable features the sleeve 6, in this instance is extended upwardly a distance from the casing 4 and is provided at its upper end with a laterally extending housing 7, in which are located contact points. At the outer end of the laterally extending portion of the housing 7 is an insulating block 8, the ends of the block preferably having slots 9 which engage ribs 10 on the walls of the housing so that the block may have sliding engagement with the housing. Extending through the block 8 are a plurality of contact posts 11, 12, 13 and 14, at the outer ends of which are connected ignition wires 15, 16, 17 and 18 respectively, which wires extend from said posts to the usual form of distributor or coil, and by extending the sleeve 6 to the height shown, said wires will be entirely removed from contact with any parts of the engine. Connected to the inner ends of the respective posts are contact arms 19, 20, 21 and 22, which are in fixed relation with said posts, while co-operating with said arms are spring contact plates 23, 24, 25 and 26, having one of their ends in position to connect respectively with the contacts 19, 20, 21 and 22, the opposite ends of said contact plates being anchored adjacent the wall of the housing diametrically opposite the wall formed by the insulating block 8. By placing the contact plates thus they extend across the upper end of the hollow sleeve 6, the contact arms and the contact plates being so constructed that they will normally rest in disengaging position.

In order to operate the contact plates for moving them into engagement with their respective contact arms to form circuits through the ignition wires, a cam structure 27 is first threaded onto the threaded end

3 of the cam shaft 2 and properly adjusted, after which it is fixed in engagement with said threaded end by a key 28, thereby holding the cam structure in absolute fixed relation with the cam shaft. The cam structure 27 is provided with a plurality of cam faces 29, 30, 31 and 32, which are designed to cooperate respectively, with plungers 33, 34, 35, and 36, the upper ends of said plungers registering with and adapted to elevate the contact plates 23, 24, 25, and 26 respectively. The upper ends of the plungers are slidably mounted through a pivoted head 37, while the lower ends of the plungers are slidably mounted through a guide block 38, said guide block being pivotally mounted in a guide frame 39, the downward movement of the plungers being regulated by stops 40, while the upward movement of the plungers is regulated by stops 41, and in order to cause the plungers to descend after they are released from their respective cam faces, coil springs 42 are introduced around the upper portions of the plungers between the stops 41 and the under face of the pivoted head 37. The guide frame is positioned directly over the opening 5, and is moved from side to side of the sleeve by means of a lever 43, said lever being preferably formed in accordance with the peripheral outline of the casing 4, so that the guide frame 39, which is fixed to the lever 43, will travel in the arc of a circle incident to the curvature of the casing 4, the inner end of the lever 43 having a projection 44 which enters a slot 45 formed in the periphery of the casing 4 adjacent one end of the opening 5, the guide frame 39 having elongated slots 46 to provide free movement of the plungers as the position of the guide frame 39 is shifted. The object of shifting the position of the guide frame 39 is to regulate or time the sparks formed by closing the contact plates with the contact arms, whereby the sparks may be created at any particular time depending upon the running condition of the engine. As for instance, when the engine is being started, the guide frame 39 is moved to the position shown in Figure 6 of the drawings, thereby retarding the spark to prevent back-firing of the engine, while under normal running conditions the guide frame will be positioned, as shown in Figure 4 of the drawings, but may be moved still further towards the right in the event the spark is to be additionally advanced.

The hollow sleeve 6 is preferably extended at an angle, as best shown in Figure 2 of the drawings, and in order to observe the operation of the contacts without opening up any parts of the timer, the cover portion 47 of the housing is provided with an opening 48 over which is placed a covering 49 of transparent material, preferably glass, and through this visual space the operating

parts of the timer may be readily observed without removing or tearing down any parts of the timer.

Having thus fully described my said invention what I claim as new and desire to secure by Letters Patent, is:

1. In a timer for engines, the combination with a cam, of a plurality of circuit forming contacts, a distance from said cam, a plurality of plungers operable by said cam for intermittently forming circuits through said contacts, a guide block through which the lower ends of said plungers extend, and means for moving said guide block in the arc of a circle around said cam for determining the position of the lower ends of said plungers.

2. In a timer, the combination with a cam having a plurality of cam faces, of a plurality of circuit forming contacts, a plurality of longitudinally movable plungers operable by said cam for intermittently forming circuits through said contacts, and means for shifting the position of the lower ends of said plungers for advancing or retarding contact with the cam faces.

3. In a timer for engines, the combination with a cam structure having a plurality of cam faces thereon, of a casing for said cam structure having an opening in one wall thereof, a hollow sleeve surrounding said opening and extending a distance above the casing, a plurality of circuit forming contacts at the upper end of said sleeve, a plurality of longitudinally movable plungers extending from said cam structure to said contacts, guiding means at the opposite ends of said plungers, and means for shifting the lower ends of said plungers laterally whereby the operation thereof will be advanced or retarded.

4. In a timer, the combination with a cam having a plurality of cam faces, of a plurality of circuit forming contacts, a plurality of longitudinally movable plungers operable by said cam for intermittently forming circuits through said contacts, an insulating block supported adjacent the upper end of said plungers, said circuit forming contacts comprising contact arms carried by the insulating block, spring contact plates therefor and normally spaced out of contact therefrom said plates being positioned above the plungers respectively for engagement therewith, a pivoted head for the upper ends of the plungers, and a pivoted guide block for the lower ends of the plungers, substantially as set forth.

5. In a timer, the combination with a cam having a plurality of cam faces, of a plurality of circuit forming contacts, a plurality of longitudinally movable plungers operable by said cam for intermittently forming circuits through said contacts, an insulating block supported adjacent the upper end of

said plungers, said circuit forming contacts comprising contact arms carried by the insulating block, spring contact plates therefor and normally spaced out of contact therefrom said plates being positioned above the plungers respectively for engagement therewith, a pivoted head for the upper ends of the plungers, a pivoted guide block for the lower ends of the plungers, stops on the plungers, and stops on the plungers for limiting the motion thereof in either direction, substantially as set forth.

6. In a timer, the combination with a cam having a plurality of cam faces, of a plurality of longitudinally movable plungers operable by said cam for intermittently forming circuits through said contacts, an insulating block supported adjacent the upper end of said plungers, said circuit forming contacts

comprising contact arms carried by the insulating block, spring contact plates therefor and normally spaced out of contact therefrom said plates being positioned above the plungers respectively for engagement therewith, a pivoted head for the upper ends of the plungers, a pivoted guide block for the lower ends of the plungers, stops on the plungers for limiting the motion thereof in either direction, and means for moving the pivoted guide block and lower ends of the plungers in an arc of a circle around said cam for simultaneously varying the points of contact between the plungers and the cam faces respectively, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Indianapolis, Indiana, this 12th day of January A. D. nineteen hundred and twenty-two.

VIRGIL H. MATHES. [L. s.]